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(54) **A method for drying or cooling particulate materials, and an arrangement in a mixing machine.**

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(73) Proprietor: **Forberg, Halvor**
Hagabakken 2 Hegdal
N-3250 Larvik(NO)

(72) Inventor: **Forberg, Halvor**
Hagabakken 2 Hegdal
N-3250 Larvik(NO)

(74) Representative: **Westerlund, Christer et al**
L.A. Groth & Co Patentbyra AB Västmannagatan 43
S-113 25 Stockholm(SE)

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Description

The present invention relates to a mixing machine for particulate material, comprising a housing forming a mixing chamber and means for supplying a cooling or drying agent downwards along the inside of the mixing chamber walls.

When particulate materials are mixed it may be desired to dry said materials during the mixing operation. It may also be required to cool the material during said mixing operation or, a combination of cooling and drying may, e.g. be required.

DE-C-102 230 discloses a method for drying particulate materials in a machine where the particles are made to circulate, with a particle flow downwards along the inside of a chamber wall. Furthermore, a drying agent is introduced from above into the interface area between the particle flow directed downwards and the chamber wall. However, in such a single drum mixing machine the particles will automatically become compacted because of the centrifugal force. In order to expose the whole particle mass to full heat transmission the particles have to be dissolved.

For this purpose the machine according to the invention is characterized by two vane aggregates fixed on essentially horizontal and mutually parallel shafts in a side-by-side arrangement inside the mixing chamber and in a manner to rotate in opposite directions, thereby throwing the particulate material to be mixed upwards in the area in between and above said vane aggregates, and the means for supplying a cooling or drying agent extending sidewards opposite to the vane aggregates.

In an embodiment of the invention there is a discharge means in the area above and between the vane aggregates.

In a preferred, practical embodiment of the invention there is a channel extending along said inside of the mixing chamber wall and opening downwards as well as being connected with a supply conduit for said medium. In an advantageous further development of the invention said channel may comprise a wall that is inclined in the channel cross section for guiding said medium towards the inside of said mixing chamber wall.

By the aid of the present invention direct cooling, drying, or the like of the material is achieved during the mixing operation. The supplied medium may, e.g. be hot air when drying is required. In case of an undesired increase of temperature in the mixing machine, the supplied medium may e.g. advantageously be cold air. Supply of a gaseous medium, e.g. air, can also have the effect that said medium forms a lubricant between particles in connection with cooling/drying.

The invention is disclosed in more detail below with reference to the drawings, where

Figure 1 is a diagrammatical end view of a mixing machine where the present invention is implemented, and

Figure 2 shows a diagrammatical plan view of the machine of Figure 1.

As mentioned, the drawings are diagrammatical and only show the components that are necessary for understanding the invention.

In a mixing chamber 1 two vane aggregates 2 and 3, respectively, are arranged. Said vane aggregates 2, 3 rotate in opposite directions about their shafts 4 and 5, respectively, as indicated by the arrows. Pariculate material to be mixed will, thus, move in two circulations in said mixing machine with a particle flow each moving down along the inside of the mixing chamber walls respectively opposite each vane aggregate.

Uppermost at each mixing chamber wall a channel 6 and 7, respectively,is provided extending along said mixing chamber wall and opening downwards. Channels 6, 7 extend along the entire length of said mixing chamber, as shown in phantom in Figure 2, and both channels 6, 7 are in the shown embodiment connected with a common supply conduit 8 for a suitable colling or drying agent, e.g. air. The supplied medium will flow along the respective channel 6, 7 downwards and outwards along the mixing chamber walls, as indicated by arrows 9, 10. Each channel 6, 7 is provided with a channel wall 11, 12 that is inclined in the channel cross section and is intended for guiding the supplied medium towards the inside of the mixing chamber wall.

Above said vane aggregates 2, 3 a discharge means 13 is shown in the shape of a ventilator in the shown embodiment. It serves to disharge gases rising from the material centrally in the mixing container, as indicated by arrows 14.

Claims

1. A mixing machine for particulate material, comprising a housing forming a mixing chamber (1) and means for supplying a cooling or drying agent downwards along the inside of the mixing chamber wall, characterized by two vane aggregates (2, 3) Fixed on essentially horizontal and mutually parallel shafts (4, 5) in a side-by-side arrangement inside the mixing chamber (1) and in a manner to rotate in opposite directions, thereby throwing the particulate material to be mixed upwards in the area in between and above said vane aggregates (2, 3), and the means (6, 7, 8) For

supplying a cooling or drying agent extending sidewards opposite to the vane aggregates (2, 3).

2. A mixing machine as defined in claim 1, characterized in a discharge means (13) in the area above and between said vane aggregates (2, 3).

3. A mixing machine as defined in claim 1, or 2, characterized in a channel (6; 7) extending along said inside of the mixing chamber wall (1) and opening downwards as well as being connected with a supply conduit (8) for said medium.

4. A mixing machine as defined in claim 3, characterized in that said channel (6; 7) comprises a wall (11; 12) that is inclined in the channel cross section for guiding said medium towards the inside of said mixing chamber wall.

Revendications

1. Machine de mixage pour un matériau particulaire, comprenant un carter formant chambre de mixage (1) et des moyens d'amenée d'un agent de refroidissement ou de séchage dirigés vers le bas le long de l'intérieur de la paroi de la chambre de mixage, caractérisée par deux groupes d'ailettes (2, 3) fixées sur des arbres (4, 5) sensiblement horizontaux et parallèles entre eux disposés côte à côte à l'intérieur de la chambre de mixage (1) et de façon à tourner dans des sens opposés, projetant de ce fait le matériau particulaire à mixer vers le haut dans la zone située au milieu et au-dessus desdits groupes d'ailettes (2, 3) et en ce que les moyens (6, 7, 8) d'amenée d'un agent de refroidissement ou de séchage s'étendent sur les côtés en face des groupes d'ailettes (2, 3).

2. Machine de mixage selon la revendication 1, caractérisée par des moyens d'évacuation (13) dans la zone au-dessus et entre lesdits groupes d'ailettes (2, 3).

3. Machine de mixage selon la revendication 1 ou 2, caractérisée par un canal (6;7) s'étendant le long de ladite paroi intérieure de la chambre (1) et s'ouvrant vers le bas, et également connecté à un conduit d'alimentation (8) dudit agent.

4. Machine de mixage selon la revendication 3, caractérisée en ce que ledit canal (6;7) comprend une paroi (11 ;12) qui est inclinée dans la section du canal pour guider ledit agent vers l'intérieur de la paroi de ladite chambre de mixage.

Ansprüche

1. Mischmaschine für Teilchenmaterial, die ein eine Mischkammer (1) bildendes Gehäuse sowie Organe zur abwärts gerichteten zuführung eines Kühl- oder Trocknungsmittels entlang der Innenseite der Mischkammervandung umfaßt, gekennzeichnet durch zwei Flügelaggregate (2, 3), die innerhalb der Mischkammer (1) auf im wesentlichen horizontalen und zueinander parallelen Wellen (4, 5) nebeneinander angeordnet und in entgegengesetzte Richtungen drehbar sind, um das zu mischende Teilchenmaterial in den Bereich zwischen und oberhalb der Flügelaggregate (2, 3) zu schleudern, wobei sich die Organe (6, 7, 8) zur Zuführung eines Kühl- oder Trocknungsmittels seitlich gegenüber von den Flügelaggregaten (2, 3) erstrecken.

2. Mischmaschine nach Patentanspruch 1, gekennzeichnet durch ein Austragorgan (13) im Bereich oberhalb und zwischen den Flügelorganen (2, 3).

3. Mischmaschine nach Patentanspruch 1 und 2, gekennzeichnet durch einen Kanal (6; 7), der sich entlang der Innenseite der Mischkammerwandung (1) erstreckt und sich einerseits nach unten öffnet und andererseits an einen Zuführkreis (8) für das genannte Mittel angeschlossen ist.

4. Mischmaschine nach Patentanspruch 3, dadurch gekennzeichnet, daß der Kanal (6; 7) eine Wandung (11; 12) aufweist, die im Kanalquerschnitt schrägt verläuft, um das genannte Mittel gegen die Innenseite der Mischkammerwandung zu führen.

FIGURE 1.

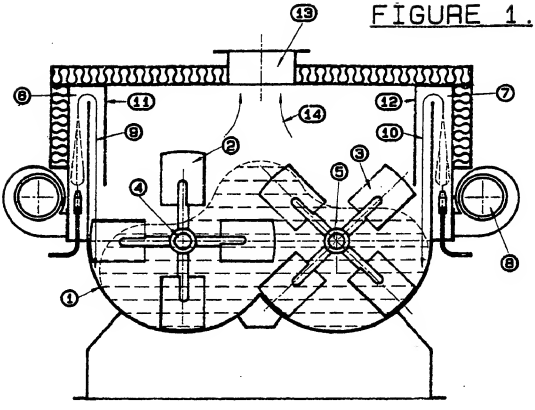

FIGURE 2